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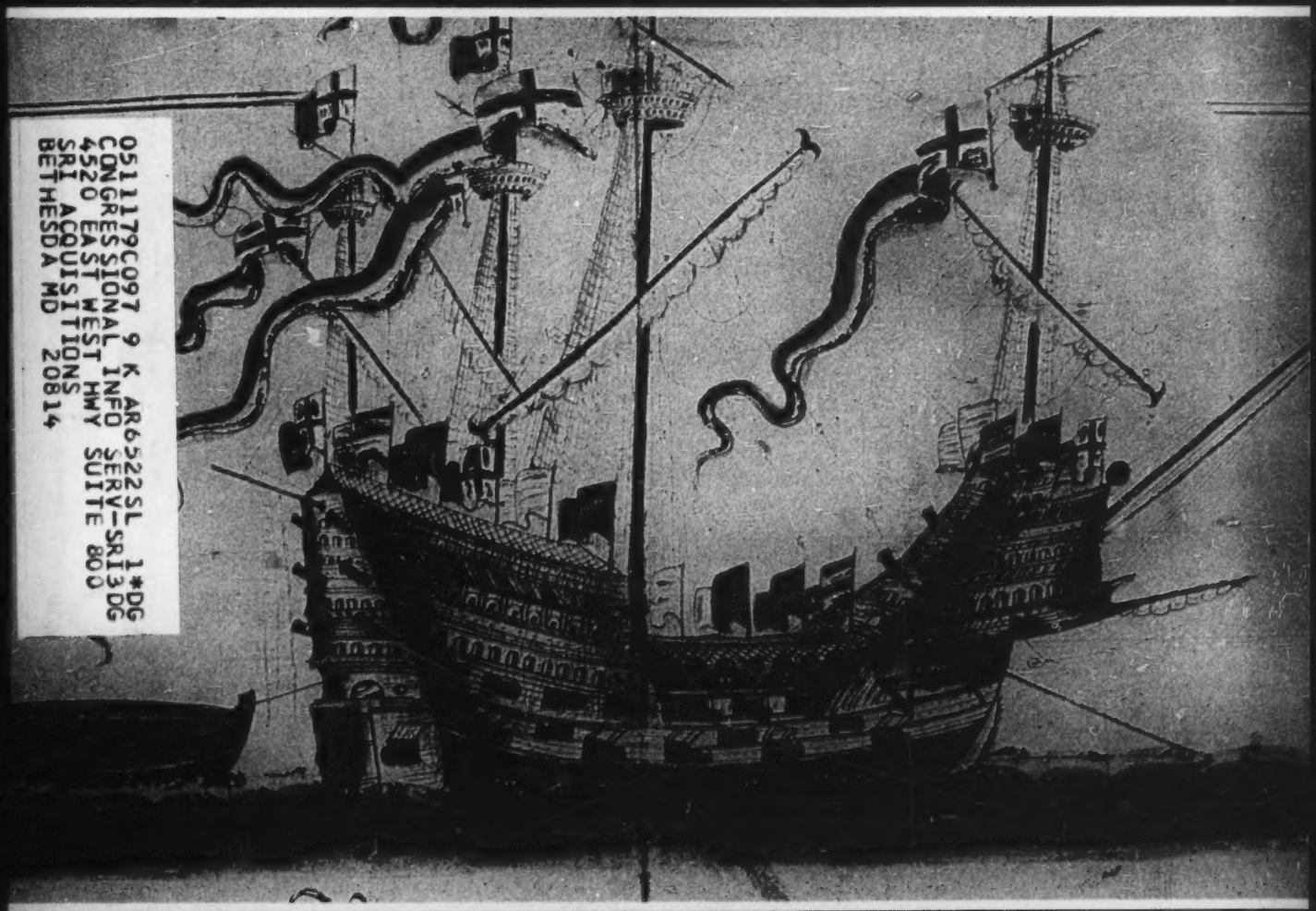
New Zealand conference focuses on methane conversion Page 22

PRELIMINARY PROGRAM ACS meeting in New Orleans Page 37

JUNE 1, 1987

CHEMICAL & ENGINEERING

NEWS



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Chemical Preservation

British attempt to conserve
16th-century vessel Mary Rose
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News of the Week

■ **U.S.'s uranium enrichment enterprise must be restructured to become competitive, forum speakers conclude.** **Page 4**

■ **USDA should expand its biotech research programs, support at least 500 postdoctoral positions to retrain scientists to work in the field, NRC report recommends.** **Page 5**

■ **Arco will offer methanol/gas blend in 25 of its service stations in southern California.** **Page 5**

■ **Studies of data to explain loss of stratospheric ozone, collected in last year's Antarctica expedition, yield only more questions.** **Page 6**

■ **The 47 chemical laboratories chosen for a study to determine the quality of drug testing had a 99.2% accuracy rate.** **Page 6**

Business

U.K.'s Courtaulds is moving away from its dependence on textiles to emphasize chemicals, materials, other areas to ensure growth. **Page 9**

Degussa, preparing to start up a hydrogen peroxide plant in Mobile, is bullish on the chemical and its many uses. **Page 14**

Government

Amendment to delete funds for the final assembly of binary chemical artillery shells defeated by the House. **Page 16**

Office of Technology Assessment warns that waste dumping into coastal waters is degrading water quality and causing human health problems, suggests remedies. **Page 17**

Technology

Economical processes to convert methane directly to fuels, chemicals discussed at international symposium in New Zealand. **Page 22**

ACS News

Official reports of the ACS Board and Council meetings held in Denver include committee reports. **Page 29**

Preliminary Program

Preliminary program for ACS national meeting in New Orleans lists all symposia, includes preregistration forms. **Page 37**

Cover: Photo courtesy of Mary Rose Trust

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Cover Story

The Mary Rose, a 16th century ship raised from the English Channel in 1982, undergoes preservation using a combination of glycols. **Page 19**

Degussa sees growing hydrogen peroxide use

Degussa Corp. has opened peroxygen chemicals laboratories at its technical center in Allendale, N.J., at a time when the company is preparing to start up an 80 million lb-per-year hydrogen peroxide plant in Mobile, Ala., in June. The laboratories will do the applications research that the company needs to expand U.S. hydrogen peroxide markets more than 10% annually from 365 million lb in 1987 to at least 590 million lb in 1992.

In addition to present applications in chemicals, pulp and paper, textiles, the environment, mining, and electronics, Degussa will find additional opportunities in cyanide destruction in precious metals refining, delignification of agricultural wastes, poultry processing, and pretreatment of wastes and supplemental oxygen supply for biological degradation, predicts marketing director Rudi Moerck. Moerck cites these domestic uses, plus expected exports, as spurs to growth as high as 15% per year.

Among other producers, Du Pont brought on an 80 million lb-per-year expansion of its Memphis hydrogen peroxide plant in January. FMC has capacities of 95 million lb per year in Bayport, Tex., and 85 million lb in South Charleston, W.Va. The Deer Park, Tex., plant of Interox is rated at 110 million lb per year. And Oxychem will start up a 45 million lb-per-year Canadian plant in the fourth quarter that will supply the whole North American market.

U.S. hydrogen peroxide sales to hit 365 million lb

Application	1987 consumption (millions of lb)
Chemical production	80
Pulp & paper	80
Textiles	45
Environmental	70
Mining	10
Electronics	10
Other	55
Subtotal	350
Exports	15
TOTAL	365

Griffiths (left), two Degussa scientists check one of their mobile mining labs

Even so, Moerck gives two reasons that the industry will sell 90% or more of effective hydrogen peroxide capacity for the next several years. First, he says, though all these startups add up to a 1987 nameplate capacity of 620 million lb, prorated capabilities of new plants will result in a nameplate figure of only 505 million lb for this year. In addition, he cautions that operating rates of hydrogen peroxide plants are really only 80% of nameplate.

Degussa's continuous process for cyanide destruction is the brainchild of mining technology manager Andrew Griffiths. A small stream of water from cyanide leaching of gold is drawn off for passage through an analysis chamber. Addition of sodium persulfate oxidizes cyanide to cyanate, and monitoring of the chamber pH and redox potential affords a steady-state titration of peroxygen needs of the stream.

Data from these measurements allow automatic setting of hydrogen peroxide addition and residence time in the main reaction chamber by a process controller. This results in complete destruction of cyanide with use of minimum hydrogen peroxide.

In the main chamber, hydrogen peroxide oxidizes cyanide to cyanate, which in turn hydrolyzes to ammonium carbonate. Also oxidized is cyanide in labile complexes of cadmium, copper, and zinc, which precipitate as hydroxides at high pH. Ferrocyanide is precipitated as the copper salt. Excess copper from this step is precipitated by trimercaptotriazine, also a Degussa product. The net result is reduction of cyanide to less than 1 ppm.

Degussa has designed a lab module to contain the analysis chamber and process controller. The module has the dimensions of a freight container, so it can be shipped to remote mining areas. For example, the company has operated such a module at a site in Papua New Guinea.

Among newer environmental uses of hydrogen peroxide, the compound may aid in microbial destruction of such substances as gasoline leaking from underground storage tanks. Injected into soil at concentrations nontoxic to soil bacteria, hydrogen peroxide can break down there to oxygen and water. The released oxygen could enhance aerobic degradation of organics that threaten to contaminate groundwater.

In poultry processing, hydrogen peroxide might find applications to treat chilled water used for multiple washings of carcasses after slaughter and dressing of birds. Wash waters contain fats and other substances from carcasses, and oxidation of these could ease recycling of these waters. Careful analyses of peroxygen needs and resulting controlled dosages would avoid both costs of excessive use and contact of hydrogen peroxide with carcasses.

Further in the future, marketing director Moerck suggests that hydrogen peroxide might be added to chilling baths where carcasses are kept before cutting into parts. This would destroy salmonella bacteria that might have gotten into chiller water by this point. Moerck notes that hydrogen peroxide would then be in contact with carcasses, however, and addition to chiller waters would thus need Food & Drug Administration approval.

Elsewhere in agriculture, Moerck foresees possible uses of hydrogen peroxide to delignify stalks from grain harvesting. This would convert such wastes into more usable cellulosic products.

Stephen Stinson, New York